

**What is Claimed Is:**

- sub A2
- 10021566-121304
1. An asymmetrical antenna, comprising
    - a substrate having opposite first and second surfaces, and first, second, third, and fourth sides;
    - a first radiating segment disposed on the first surface of the substrate, including:
      - a first conductive strip of substantially L shape disposed along the first and second sides of the substrate; and
      - a second conductive strip of substantially L shape having one end connected to the first conductive strip near the second side of the substrate and one free end extending towards the first side of the substrate; and
    - a second radiating segment disposed on the first surface of the substrate, including:
      - a third conductive strip of substantially L shape disposed along the first and fourth sides of the substrate; and
      - a fourth conductive strip of substantially L shape having one end connected to the third conductive strip near the fourth side of the substrate and one free end extending towards the first side of the substrate.
  2. The asymmetrical antenna of claim 1, wherein the second conductive strip forms a quadrangular conductive layer at the free end.
  3. The asymmetrical antenna of claim 1, wherein the third conductive strip has two free ends.
  4. The asymmetrical antenna of claim 1, wherein the antenna is connected to a ground via a conducting element disposed on the free end of the second conductive strip.

A2  
cont'd

5. The asymmetrical antenna of claim 1, wherein the antenna is sized and configured to work in a low frequency band and a high frequency band.

6. The asymmetrical antenna of claim 5, wherein the first conductive strip is sized and configured to work in the low frequency band and the second conductive strip is sized and configured to work in the high frequency band.

7. An antenna module formed on a housing for a circuit board having communication components disposed thereon, comprising:

a housing element having opposite first and second surfaces, and first, second, third, and fourth sides;

a first radiating segment disposed on the first surface of the housing element, including:

a first conductive strip of substantially L shape disposed along the first and second sides of the housing element; and

a second conductive strip of substantially L shape having one end connected to the first conductive strip near the second side of the housing element and one free end extending towards the first side of the housing element;

a second radiating segment disposed on the first surface of the housing element, including:

a third conductive strip in of substantially L shape disposed along the first and fourth sides of the housing element; and

a fourth conductive strip in of substantially L shape having one end connected to the third conductive strip near the fourth side of the housing element and one free end extending towards the first side of the housing element; and

an inner conductive layer disposed on the second surface of the housing element electrically connected to the first and second radiating segments;

10021666-121504

A2  
cont'd

wherein the inner conductive layer is configured to form signal communication with the circuit board when the circuit board is mounted in the housing.

8. The antenna module of claim 7, wherein the second conductive strip forms a quadrangular conductive layer at the free end.

9. The antenna module of claim 7, wherein the third conductive strip has two free ends.

10. The antenna module of claim 7, wherein the antenna module is sized and configured to work in a low frequency band and a high frequency band.

11. The antenna module of claim 10, wherein the first conductive strip is sized and configured to work in the low frequency band and the second conductive strip is sized and configured to work in the high frequency band.

12. The antenna module of claim 7, wherein the inner conductive layer forms a conductive shield over the communication components disposed on the circuit board when the housing receives the circuit board.

13. The antenna module of claim 12, wherein the conductive shield is tunnel-shaped.

14. The antenna module of claim 7, wherein the first and second radiating segments connected to the inner conductive layer via a connecting element.

15. The antenna module of claim 14, wherein the connecting element includes a plurality of metalized holes.

10021555-121304

A2  
cont'd

16. The antenna module of claim 7, wherein the inner conductive layer forms an electrical contact with the circuit board when the circuit board is received by the housing.

17. An antenna module formed on a housing for a circuit board having communication components disposed thereon, comprising:

- a housing element having opposite first and second surfaces;
  - an antenna element formed on the first surface of the housing element for receiving and/or transmitting electromagnetic signals; and
  - an inner conductive layer disposed on the second surface of the housing element electrically connected to the antenna element;
- wherein the inner conductive layer is configured to form signal communication with the circuit board when the circuit board is mounted in the housing.

18. The antenna module of claim 17, wherein the inner conductive layer forms a conductive shield over the communication components disposed on the circuit board when the housing receives the circuit board.

19. The antenna module of claim 18, wherein the conductive shield is tunnel-shaped.

20. The antenna module of claim 17, wherein antenna element is connected to the inner conductive layer via a connecting element.

21. The antenna module of claim 20, wherein the connecting element includes a plurality of metalized holes.

22. The antenna module of claim 17, wherein the inner conductive layer forms electrical contacts with the circuit board when the circuit board is received by the housing.

1002466-12101

A2  
cont'd

23. A mobile communication device comprising:

a housing having opposite first and second surfaces and enclosing a circuit board having communication components disposed thereon;

an antenna element formed on the first surface of the housing for receiving and/or radiating electromagnetic signals; and

an inner conductive layer disposed on the second surface of the housing electrically connected to the antenna element, the inner conductive layer being in signal communication with the circuit board.

24. The mobile communication device of claim 23, wherein the inner conductive layer forms a conductive shield over the communication components disposed on the circuit board.

25. The mobile communication device of claim 24, wherein the conductive shield is tunnel-shaped.

26. The mobile communication device of claim 23, wherein antenna element is connected to the inner conductive layer via a connecting element.

27. The mobile communication device of claim 26, wherein the connecting element includes a plurality of metalized holes.

28. The mobile communication device of claim 23, wherein the inner conductive layer forms electrical contacts with the circuit board.

29. The mobile communication device of claim 23, wherein the housing includes an upper cover and a lower cover, and the antenna element is formed on the lower cover.

10021555-121501

42  
cont'd  
30. The mobile communication device of claim 29, wherein the antenna element is formed substantially only on the bottom half of the lower cover.

31. The mobile communication device of claim 23, wherein the antenna element is covered by an insulating paint layer.

32. A mobile communication device comprising:

a housing having a front cover element and a back cover element, and enclosing a circuit board having communication components disposed thereon, the front cover element having a display, a speaker, and a plurality of keys; and

an antenna element formed on the back cover element for receiving and/or transmitting electromagnetic signals;

wherein the antenna element is formed substantially only in the bottom half of the back cover element.

33. An antenna module for mounting in a housing for a circuit board that has communication components disposed thereon, comprising:

a substrate having opposite first and second surfaces;

an antenna element formed on the first surface of the substrate for receiving and/or transmitting electromagnetic signals; and

an inner conductive layer disposed on the second surface of the substrate electrically connected to the antenna element;

wherein the inner conductive layer is configured to form signal communication with the circuit board when the circuit board is mounted in the housing.

34. The antenna module of claim 33, wherein the inner conductive layer forms a conductive shield over the communication components disposed on the circuit board when the circuit board is mounted in the housing.

A2  
cont'd

35. The antenna module of claim 34, wherein the conductive shield is tunnel-shaped.

36. The mobile communication device of claim 33, wherein antenna element is connected to the inner conductive layer via a metalized hole.

37. The mobile communication device of claim 33, wherein the inner conductive layer forms electrical contacts with the circuit board.

10021555-121801